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LECTURES ON FSR III REVISITED:

**The Tactical Thought of J.F.C. Fuller
Applied to Future War**

by
Major Anthony M. Coroalles
Infantry

School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

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ABSTRACT

LECTURES ON FSR III REVISITED: The Tactical Thought of J.F.C. Fuller Applied to Future War, by Major Anthony M. Corrales, U.S. Army, 47 pages.

In 1932 J.F.C. Fuller published a book entitled Lectures on FSR III (Lectures on Field Service Regulations, Vol. III). In this book, Fuller presented a vision of future war that was shown to be highly accurate by later events. This vision was based on a careful study of how future conditions would likely affect the elements of mobility, protection, and firepower. He reasoned that these conditions had now made the tank the "master-weapon" of the battlefield - the weapon around which doctrine, organizations, and tactics should be constructed. From this appreciation, Fuller then developed the tactical concepts for the employment of mechanized forces which he presented in his book.

This paper examines the tactical thought of J.F.C. Fuller and applies his thinking to determine whether the tank is still the "master-weapon" of the battlefield. The paper concludes that based on the impact that current conditions are likely to have on the elements of mobility, protection, and firepower that the tank should no longer be considered the centerpiece of our doctrine, organizations, and tactics. Armored forces will continue to remain the weapons of decision, but the "master-weapon", the weapon that will dominate the pace of future combat, is the helicopter.

CONTENTS

| | |
|-------------------------------------------------------|----|
| Abstract..... | i |
| Table of Contents..... | ii |
| Chapter I. Introduction..... | 1 |
| Chapter II. Background..... | |
| The Early Years..... | 2 |
| The World War I Years..... | 4 |
| The Inter-War Years..... | 6 |
| Chapter III. The Military Thought of J.F.C. Fuller... | |
| The Science of War..... | 8 |
| The Elements of War..... | 9 |
| The Principles of War..... | 17 |
| The Conditions of War..... | 17 |
| The Master-Weapon and its Effect on | |
| Tactics..... | 19 |
| Methodology..... | 21 |
| Chapter IV. The Face of Future War..... | |
| The Importance of Proper Doctrine.... | 21 |
| The Current Challenge..... | 25 |
| Conditions Affecting Weapons..... | 26 |
| Conditions Affecting Mobility..... | 28 |
| Conditions Affecting Protection... | 30 |
| Assessment of Current Conditions..... | 31 |
| The Master Weapon of the Future..... | 32 |
| Chapter V. Conclusion..... | 36 |

I. INTRODUCTION

In 1932, a rare and strangely prophetic book appeared on the world's military literary scene. It was written by a brilliant and highly controversial British Major General by the name of John Frederick Charles Fuller. He called his book, Lectures on FSR III. In the pages of his book, General Fuller presented an extremely accurate vision of the form that the world's next major armed conflict was to take. The book was carefully read by General Heinz Guderian of later Blitzkrieg fame and at the time Germany's foremost tank expert. The Soviet Army initially issued 30,000 copies of it and designated it as a table book for all Red Army officers. Later, the Soviets increased publication to 100,000 volumes. In Czechoslovakia, it became the standard reference for the teaching of mechanized warfare at their staff college. Ironically, in England only 500 copies were sold by 1935 while in the United States, the Infantry Journal received a copy at the time of publishing but failed to review it.¹

The importance of the book, however, does not lie in the fact that it foretold the tactical developments that were to take place during World War II, but rather, in the method that enabled J.F.C. Fuller to predict them. In 1932 Fuller, was able to grasp correctly the effects that new conditions, brought about by new technology, would have on

warfare. He accurately foresaw that these changed conditions had made the tank the new "master-weapon" of the battlefield and translated this appreciation into a concept for employment of mechanized forces which proved to be remarkably accurate.

Today, the tank remains the centerpiece of ground tactical combat in open terrain. However, is the tank's central position in this terrain, and subsequently in our tactics, organizations, and doctrine, justified by current battlefield conditions? In this paper I will analyze the military thought of J.F.C. Fuller and the method that he used to see the future so clearly. Then, using this methodology as a crystal ball, I will attempt to analyze present conditions with the goal of determining what should be the master-weapon of the future.

II. BACKGROUND

A. The Early Years

J.F.C. Fuller, generally regarded as the most original of the British tactical military thinkers, was born on September 1, 1878, in Chichester, England.² His early years were undistinguished and gave the casual observer few signs of his future brilliance.³ At seventeen, he was unprepared to enter Sandhurst, and had to attend a prep school to remedy the situation. There he applied himself and passed

his examinations and in 1897 entered the Royal Military College.⁴

A year later, at the age of twenty, he entered the army and was assigned to garrison duty in Ireland. Soon after the outbreak of the Boer War, he was sent to South Africa as an intelligence officer where, at the time, he recalls he "had no interest whatever in things military."⁵ After nineteen uneventful months on the veldt, Fuller was posted to India in 1903 where he became interested in eastern religions, Yoga and philosophy. There, he taught himself to think systematically and learned to reduce military problems to fundamentals.⁶ He reasoned that the solution to any tactical problem revolved around the proper employment of weapons. The tactician first had to understand the inherent capabilities and limitations of the weapons at his disposal. With this in mind, he could then employ his weapons to solve the problem at hand in such a manner as to maximize their capabilities and minimize their limitations.⁷ His constant habit of stressing this point by saying, "Give me the power and limitations of any weapon you like and in half an hour, I will give you a reasonable tactical answer," earned him the nickname of "Bonaparte" or "Boney" for short from his fellow officers.⁸

In 1906, he returned to England with enteric fever and upon his recovery was assigned as adjutant to the 10th Middlesex, a volunteer unit. This assignment stimulated

Fuller. He began to study war seriously and to publish his views on training, discipline, and tactics. In these early writings, he was critical of current tactical concepts.⁹ Unlike many of his contemporaries, Fuller fully appreciated the impact of technological developments on tactics. He reiterated that properly handled weapons, and not dogmas founded on past successes, were the keys to future victory.¹⁰

B. The World War I Years

In 1913, J.F.C. Fuller entered the staff college and by the outbreak of World War I, he had acquired a reputation in the British Army as being heretical yet brilliant.¹¹ This reputation was further fueled by the writing of several articles critical of the war at the highest levels.¹²

Following a number of routine assignments, Fuller found his niche as a staff officer with the recently organized tank units. Here, he had the opportunity to exercise fully his imagination and his flair for relating new developments to tactics.¹³ He wrote the first tank manual, Training Note No. 16, plus most of the other notes on tank training and tactics. He examined every bit of information and analyzed every after action report to test his theories. He then reformulated these theories and presented them in a series of brilliant and farsighted papers on the mechanics of tank warfare.¹⁴ Finally, he produced the revolutionary "Plan 1919."

Fuller's "Plan 1919" was novel in that it aimed at the enemy's brains as a means to bring about a collapse at the front. The concept sought to achieve a strategic paralysis by cutting off the German command structure from its fighting forces.¹⁵ The Germans were first to be persuaded to mass reserves in a chosen sector outside of the planned area of operations. Next, operating on a front of ninety miles, a surprise stroke of medium tanks would take place. This "Disorganizing Force" would puncture the German front lines and head straight for the army, corps, and divisional headquarters located in the rear. Then, with the German command structures either destroyed or dispersed he intended to launch a carefully planned tank, infantry, and artillery attack against the enemy front lines on a fifty mile front. This attack would then be exploited by a pursuit force of medium tanks and truck mounted infantry. To support the attack, the Royal Air Force would provide reconnaissance, tactical assistance, and deep bombing attacks on the German western G.H.Q., which Fuller believed would, "At least neutralize clear thinking."¹⁶

The war, of course, ended before this revolutionary plan, calling for attack on the cybernetic system as a means of precipitating defeat at the front, could be put to the test. The plan did, however, win acceptance at high levels and clearly provided the basis for Fuller's theories on mechanized warfare which emphasized the disorganization and paralysis of the enemy's command structure. The similarity

between the outline of "Plan 1919" and what later became known as Blitzkrieg is striking.¹⁷

C. The Inter-war Years

After the war, Fuller served as chief instructor at the staff college, as military assistant to the Chief of the Imperial General Staff, and as commander of the 13th Infantry Brigade.¹⁸ While commanding this brigade in 1930, he wrote an interesting small volume of commentary on the official infantry training manual entitled Lectures on F.S.R. II. The volume accentuated the weakness of infantry as a separate arm and demolished arguments for horse cavalry altogether. Typical of his prose, in his fourth lecture, he stated that he could not swallow official doctrine on cavalry in the attack "without grave risks of acute mental indigestion."¹⁹ Naturally, remarks such as these did not endear him to the strong cavalry establishment.

In 1930, he was promoted to Major General and in 1932 his Lectures on F.S.R. III were published. Fuller's reasons for publishing this book can best be told in his own words:

"For many years now I have urged that general tactical training for war demands two books, one dealing with present day warfare, and the other with future warfare. The first of these books is represented by "Field Service Regulations, Vol II," the second should be represented by "Field Service Regulations, Vol III," hence the title of these lectures; lectures written on a book which does not exist, but which should exist and one day no doubt will exist."²⁰

Fuller intended this book to be a book of ideas; a book which would cause soldiers to think rather than to accept blindly official doctrines and positions. He believed that the only way to prevent the ossification of the mind was: "to accept nothing as fixed, to realize that the circumstances of war are everchanging and that consequently organization, administration, strategy, and tactics must change also."²¹

The post-war British Army, however, was mentally well ossified and Fuller's arguments fell on closed, hostile minds. For too long his sharp tongue and poison pen had tormented the small minds that he believed were running the army; minds expert on petty details yet incapable of visualizing what seemed to him so obvious.²² He had made himself such a nuisance to these highly situated officers that for all practical purposes, his military career was at a dead end. Not surprisingly, on 14 December 1933, after refusing a second-rate assignment to India, he was placed on the retired list at the age of fifty-four.²³

As mentioned earlier, his works were widely accepted outside of England. Yet, because he attacked the system and those who were in charge of it, he became "persona non grata" to many people inside of the British military establishment.²⁴ The unfortunate result was that his works were generally ignored by the audience that he was

attempting to reach--an important lesson for anyone trying to work for change from inside of an organization.

III. THE MILITARY THOUGHT OF J.F.C. FULLER

A. The Science of War

From his earliest writings, General Fuller maintained that war was both a science and an art.²⁵ As a science, he felt that war was governed by fixed laws or principles. How weapons, units, and the principles were applied to fluctuating, new, and different conditions encompassed the art of war.²⁶ However, he believed that the science of war must be mastered before its forces could be correctly employed as an art.²⁷ That is to say, a soldier first had to master his tools before he could expect to apply them to solve military problems in a creative and artistic fashion.

He believed that to master the science of war required a systematic approach since war, as all other sciences, is built on an innumerable number of facts. Therefore, to sort and catalog these facts should be the first task of the student of war. This sorting requires a mechanism which not only splits these facts into their component parts, but also disentangles the simple from the complex.²⁸ With this accomplished, it is then possible for the student to do two things. First, he can study military history to extract analytically from it facts, and from these facts build up theories. Secondly, when faced with a military problem, he

can use the sorting and simplifying mechanisms to construct an empirical plan or solution.²⁹

The sorting and simplifying mechanisms that he developed were three in number. The first, the Elements of War, helped to simplify the functions that take place in battle. The second, the Principles of War, were aids to the development of a proper plan of action. And the third, the Conditions of War were factors to be taken into account because of their impact on the Elements of War during operations.³⁰

1. The Elements of War

J.F.C. Fuller arrived at the Elements of War by analyzing the functions that take place in the simplest possible battle--a duel between two unarmed men. In such a duel, a man moves toward or away from his enemy, attempts to hit him, and at all times protects himself from being hit. Expanding the simple idea of the basic duel to a battle between armies, Fuller found the fundamental physical elements to be: Movement, Weapons, and Protection. To these three physical elements he added a fourth element, man himself, and arrived at: Man, Movement, Weapons, and Protection as the four Elements of War.³¹

Historically, the power of the physical Elements of War change as weapons, mobility, and means of protection change. The functions that these elements express remain constant,

however.²² In every age armies have moved, used weapons, and attempted to protect themselves.

What has not been accepted so universally is the relationship between the tactical functions and the tactical means. For in most armies, Fuller maintained that weapons have evolved on no rational plan. "New means, as frequently as not, have been invented and adopted without any definite tactical idea behind them. Old weapons have been maintained and the old and new mixed, irrespective of their functional values."²³

Generally, tactical functions have remained constant in warfare. These functions are: reconnaissance/security; the fixing or holding of the enemy; maneuvering to positions of advantage; developing weapons power on the enemy; close assault; and protecting ourselves from the enemy.²⁴ To accomplish each of these functions, requires the application of the Elements of War to one degree or another. Therefore, a proper understanding of each of these elements is required if we are to develop weapons and organizations to effectively accomplish these functions.

The Element of Movement: Fuller maintained that movements can be of two types: defensive or offensive. During defensive movements, the goal of the unit or soldier is to avoid being hit; during offensive movements, it is to hit or bring fire on the enemy. The more fire that can be brought on the enemy, the less fire will be received.

Therefore, indirectly, offensive movements provide protection, and the more the offense succeeds, the greater the protection.²⁵

The purpose of all offensive movements is to develop weapon power against the enemy. Conversely, the objective of all defensive movements is to prevent the enemy from developing weapon power against ourselves. When a unit is moving toward or away from an enemy, and is not in contact, the movement is defensive in nature. Upon contact the movement becomes offensive. The focus shifts from trying to avoid being hit to hitting the enemy in order to either defend yourself or destroy him. Direction, whether we are moving toward or away from the enemy, thereby loses its importance. As a result, the distinction between "offense" and "defense" blurs at the tactical level.

The Element of Weapons: Weapons allow the expression of offensive intent and provide the means to defend against it. Weapons have four purposes: to kill, to injure, to destroy, and to terrorize. Today, these purposes are accomplished by four modern types of weapons: weapons for thrusting or cutting (such as the bayonet); missiles (such as rifles, artillery, cannon, and mines); Nuclear, Biological, and Chemical (NBC); and, soon to appear, directed energy and particle beam weapons.

Fuller believed that whenever two weapons of unequal range are employed, the one of longer range is always the

protective weapon while the one of shorter range the offensive weapon.²⁶ Thus, TOWs overwatching an attack are acting protectively to the tanks and infantry fighting vehicles (IFVs), but at the same time, are acting offensively in relation to the artillery to their rear, which in turn is acting protectively to both the TOWs and the tanks. The full appreciation of this fact forms the backbone of the attack from which battle organizations and tactics radiate. Fuller believed this relationship to be so important that he elevated it to a rule:

"In all circumstances, the longer range weapons must be employed to facilitate or ward off the employment of the shorter range weapons."²⁷

He believed that this rule formed the foundation of fire supremacy - the paralyzing of an opponent's power to fire so that he may be hit and destroyed.

He also believed as a basic tenet, in the "primacy of weapons." That is, that weapons, if only the right ones can be discovered and properly applied, formed ninety-nine percent of victory.²⁸ He explained that in modern war the one thing that is certain is:

"that no army of fifty years before any date selected would stand a dog's chance against the army existing at this date. Thus: 1) Napoleon was an infinitely greater general than Lord Raglan; yet Lord Raglan would, in 1855, have beaten any army Napoleon could have led against him because Lord Raglan's men were armed with the mini-rifle. 2) Eleven years after Inkerman, Moltke would have beaten Lord Raglan's army hollow, not because he was a greater general, but because his men were armed with the needle gun."²⁹

We can continue this analogy by comparing our army today, with M1 tanks and Bradley fighting vehicles, to our army of the 1970's; and were we to be engaged in a serious war tomorrow, today's army would soon be at a disadvantage. This is because the rate of technological change is continuously increasing and during wartime this rate would receive additional impetus. The lesson here is that at the outset of a war, the army which is more mentally prepared to meet technological changes and translate these into tactical changes will possess an enormous advantage.

The Element of Protection: Protection is as much a part of every forward movement, holding action, or retrograde as it is of the defensive. We have already discussed how anti-tank weapons protect the tank/IFV as well as how defensive movement protects the attack by lessening friendly losses when units are advancing. Both of these forms of protection are indirect - they do not ward off blows, but rather prevent blows from being delivered, either by giving them or by making the target difficult to hit.⁴⁰

In addition to these indirect means of protection, direct means of protection are available; such as armor, NBC masks, and defensive positions. The object of all such direct protection is to nullify the effects of fire when hit.

Direct and indirect protection may be divided into two further categories - mobile and static. Thus tanks, body

armor, and eye armor offer mobile direct protection, while defensive fighting positions and masking terrain can be categorized as static direct protection. An artillery battery is a static means of indirect protection since it can fire only when it is stationary. When a tank fires suppressive machinegun fire against an anti-tank guided missile (ATGM) position, it is providing mobile indirect protection for itself. Additionally, mobility and speed, in and of themselves, also provide indirect protection by making the target harder to hit. Thus, we can easily see that the highest degree of protection is achieved when mobile, direct, and indirect protection can be combined in one system, as has been done in the tank.

The Element of Man: The above three elements are the physical elements of warfare. These three elements are controlled by man and are operative at all levels. At the lowest level, it is the individual soldier that decides how he is to move, fire, and protect himself while performing his mission as a member of a squad. Similarly, at the division level, the commander attempts to protect his command from the enemy's firepower while he moves subunits to positions from which they can apply their firepower against the enemy. Thus, since man is the controlling entity in the application of the other elements, those factors which impact on man's performance in war, and on the organizations which he commands, are of critical importance

to the proper application of firepower, mobility, and protection.

Fuller believed that all men and soldiers in particular, operate in three spheres; the moral, physical, and mental.⁴¹ When all things are equal, and often when they are not, the moral ascendancy of one side over its opponent can be decisive. Fighting spirit, the will to close with the enemy at the risk of one's life in order to defeat him, is dependent on many variables. Among these are patriotism, belief in a cause, pride, small group bonding, trust, anger, and hate.⁴²

Man, however is a slave to his physical nature and the strongest chain that binds him to his nature is fear. The desire for self-preservation and its corollary of avoiding danger are the building blocks upon which true tactics are founded. This instinct for self preservation plays a predominant part in war by urging the soldier to do one of three things:

- * Abandon his position in order to escape danger.
- * Remain in position in order to avoid approaching danger.
- * Advance, and by defeating his enemy, overcome danger.⁴³

The degree of fighting spirit and confidence present in a unit determines whether or not fear will be conquered. Other physical chains such as hunger, pain, discomfort, exhaustion, and lack of sleep can also be conquered or mitigated by good leadership and strong fighting spirit.⁴⁴

While soldiers mainly operate in the moral and physical spheres, leaders, particularly higher level commanders, operate primarily in the mental and moral spheres. The development of a unique plan of action to accomplish a mission under a particular set of conditions is an intellectual act. The soundness of the plan is a reflection of the commander's grasp of both the science and art of war.⁴⁵ The plan, however, is also a reflection of his moral sphere.

A commander's moral sphere is different than that of the soldier. His fear is not caused by a desire for selfpreservation but rather for the preservation of his command. His fighting spirit will determine what risks he will take, how bold his plan will be, and how steadfast his will to see his plan through in the face of adversity and unforeseen circumstances will be.⁴⁶

The great captains, Alexander, Hannibal, Caesar, Marlborough, and Napoleon were all masters of the Element of Man. First and foremost, they understood themselves, their men, and their enemies and in so doing operated on a solid foundation when applying the other elements.

2. The Principles of War

The second of Fuller's simplifying mechanisms are the Principles of War. Today the US Army recognizes these principles as: Objective, Offensive, Maneuver, Mass, Economy of Force, Surprise, Security, Simplicity, and Unity of Command. Since the principles are generally well understood, we will not dwell on them except to outline Fuller's thoughts on them.

J.F.C. Fuller believed the principles of war to be the governing laws of war, which, if properly understood and taken into account when developing a plan, would produce a sound course of action. He also believed that the value of the principles lies in their application. Proper application, in turn, depends on an accurate and complete estimate of the conditions which surround the Elements of War during operations.⁴⁷

3. The Conditions of War

The Conditions of War are numerous and everchanging and depend on the particular situation at hand. Some of the most important considerations are: the enemy and his weapons, time, space, terrain, morale, intelligence, training, supply, and numbers.⁴⁸ Each of these conditions, Fuller believed, had a dual nature - a power to increase the endurance of the attacker and a power to increase the resistance of the defender. Therefore, each can be looked

upon as possessing the power of enhancing offensive and defensive action in war.⁴⁹

When faced with any of the above conditions, a commander has three options. He may: avoid the condition; break it down; or turn it to his own advantage. Fuller recommended that the third course, turning it to advantage, is manifestly the best and the one most often employed by great commanders and successful organizations.⁵⁰

To turn a condition into an advantage a commander or an organization must properly appreciate its impact on the power of the physical elements of war. The power of the physical elements of war has continuously increased throughout history. Along with this increase in power has come an increase in the rate of change. This rate of change has increased to such a degree that change by itself can be considered as a condition of war. Nevertheless, the functions required of units and individuals in war have remained the same; to move, to hit, and to guard. Thus, the basic tactical problem also remains the same: To translate the physical elements of war into actions, in changed conditions, with the greatest effectiveness.⁵¹

Historically, armies have attempted to solve this problem by organizing weapons and men in a fashion that they believe will be effective for the perceived conditions. This organization is critically important; for if it is

incorrect it will be extremely difficult to rectify in time of war.

4. The Master-Weapon and its Effect on Tactics

Certain factors have exerted greater influence than others in the evolution of weapons. Among these prime factors are range, accuracy, volume of fire, and portability. In Fuller's opinion, range was the most important of these factors. He believed that the full understanding of the importance of range was the key to tactical efficiency - the combined use of weapons in battle.³²

With every change in weapons our tactics must also change. With this change we must also decide which is the most dominant weapon and around this weapon we must arrange for the cooperation of all other weapons.³³

"In the days of Alexander the Great, when shock weapons were dominant it was the *sarissa*, a pike from eighteen to twenty-one feet in length, which on account of its reach, was the masterweapon which shaped Alexander's tactics. Equipped with it his heavy infantry held back or fixed the enemy, and by so doing enabled his heavy cavalry to charge at an advantage. In the Middle ages the English long bow played a similar part, for by killing and wounding the horses of the French knights it enabled the English knights to charge home. Be it noted, *and carefully so*, that it is not necessary for the master weapon to be the decisive weapon. In the above examples it was not. Its qualifications to mastership are to be sought in its ability to immobilize or upset the enemy's tactics and so enable other weapons to be decisively used. In short, *it sets the tactical pace.*"³⁴

Tactically, forces are organized primarily to perform either the "striking" or "fixing" functions.³⁵ The main

requirement being that striking forces must be as mobile as possible while the holding forces should be as stable as possible.⁵⁶ Similarly, the master weapon can functionally be a fixing weapon or a striking weapon. In the above examples the master weapon was employed to fix the enemy force in order to allow the striking force to hit the flanks and rear. During WW I artillery was the master weapon. It too was a fixing weapon, and it too set the pace of ground combat.

In 1914 Fuller wrote:

"That the grand tactics of an army will chiefly depend on the value its commander sets on any particular weapon (as well as the close cooperation of all available weapons and means toward the desired end); and that the commander who first grasps the true trend of any new, or improved, weapon, will be in a position to surprise an adversary who has not."⁵⁷

During the inter-war years the Germans recognized that the tank was the new master weapon of ground combat. Its mastership lay not in being superior to every other weapon, but rather because its velocity on land set the tactical pace.⁵⁸ They also recognized that its true function was that of striking and not of fixing. With this tactical idea in mind, they then developed organizations and tactics which reflected this understanding. The results of this appreciation fully confirmed Fuller's prediction.

B. Methodology

Applying all of the above to our initial goal of predicting future tactical developments leads us to the following methodology:

* First, we must accurately grasp the conditions which are likely to be present in future conflicts and turn these to our advantage.

* Second, we must analyze the impact of these conditions on the Elements of War and based on this analysis accurately determine the master-weapon under the new conditions.

* Third, we must develop doctrine and organizations based on the perceived master-weapon.

IV. THE FACE OF FUTURE WAR

A. The Importance of Proper Doctrine

The form that future war will take will be initially determined by the operational and tactical doctrines that the belligerents bring to the battlefield. These doctrines will either be appropriate to the conditions of the time, or as has often been the case, useless and dangerous baggage which must be discarded in the heat of battle.

Prior to World War I, the French, German, and Russian Armies developed offensively based doctrines. The doctrines

came about primarily because of each army's institutional biases for offensive action which therefore resulted in selective interpretations of the Wars of 1866 and 1870.⁵⁹ The two most dominant manifestations of this trend were the French doctrine of "*offensive & outrance*" and the German fixation on a Cannae-like battle of annihilation. Examples which did not fit this predilection for the offense, such as the American Civil War and the Russo-Japanese War, were dismissed as aberrations or contests between amateurs.⁶⁰

The tragic results of these flawed doctrines, based on faulty assessments of the conditions of war at the time, were most evident on the Western Front.

Here, the Germans attacked through Belgium using the famous Schlieffen Plan. The French promptly counterattacked with great gallantry and elan through Lorraine to the Rhine. The "spirit of the bayonet" however, failed to impress the German rapid-fire artillery and machineguns and Plan XVII sputtered to a halt at a cost of 300,000 French casualties. The Schlieffen Plan also came to an unsuccessful conclusion on the banks of the Marne and by the end of September 1914, all five of the principal warring powers had been frustrated in their original plans.⁶¹

The race to the sea and the stalemate of trench warfare followed and names such as the Somme and Verdun went down in history as being synonymous with butchery and stupidity.

What happened is easy to see in retrospect: The conditions of war had changed with technology while the doctrines and dogmas of each army had not. The machinegun, rapid-fire artillery, and barbed wire had greatly increased the power of the elements of weapons and protection. Such increases in firepower generally favor the defense while increases in mobility favor offensive action.⁶² In World War I, the increases in firepower were such that offensive movement in its classical form was brought to a halt. As a result, in order to counter the effects of this fire, men sought the protection of the ground and trench warfare developed.

It was not until 1918 that each army developed appropriate responses to the prevailing conditions. The Germans countered with infiltration tactics, a doctrinal innovation, and the Anglo-French with the tank, a technological innovation. Both counters were appropriate and as WWII would later show, devastating when combined. It was tragic, however, that military professionals prior to the war failed to see properly the implications that current technology would have on future war. Had they done so, it is unlikely that the butcher's bill would have been so high.

On the eve of the Second World War, France staked its national survival on the power of the vast defensive fortifications of the Maginot Line and on the impregnability of the Ardennes Forest to large mechanized formations. To

the French, the dominant tactical lesson of the First World War was linked to the preeminence of fire power. Fire power became a fetish to which every innovation was subordinated.⁶³ Out of this fixation with firepower developed the concept of the "methodical battle". This step-by-step process called for the controlled movement of men and materiel according to strict timetables. The process was designed to generate the maximum amount of firepower from every man and weapon under complete centralized control.⁶⁴ Not surprisingly, the tempo of operations was based on that of the prime merchant of firepower, the artillery. As a result, operations were conducted as slow and deliberate affairs. Indeed, rapidity of thought and execution were not highly prized qualities in the execution of the methodical battle.

Although the methodical battle incorporated tanks, they were employed and organized as adjuncts to infantry.⁶⁵ Thus, their organizations and tactics failed to maximize fully the capabilities of the tank. The overriding concern with the generation of firepower blinded French leaders to the potential that the tank presented for offensive action.⁶⁶ Visionaries, such as General Charles de Gaulle and General Jean-Baptiste Estienne, saw this fatal mistake. Yet, they went unheeded when they recommended the formation of armored units designed to capitalize on the mobility and armored protection of the tank.⁶⁷

Conversely, in Germany, the bitter pill of defeat had served as the impetus for military thought and innovation. As a result, the Wehrmacht entered the war with coherent doctrine, effective organizations, and revolutionary tactics.⁶⁶ They recognized that armored mobility, wireless radio, and the airplane had changed the conditions surrounding the Elements of War and translated this recognition into doctrine, organizations, and tactics which took advantage of the changed conditions. This combination was nearly unstoppable and for four years Blitzkrieg ran unchecked.

France's flawed appreciation of these changing conditions and their effect on the Elements of War are stark when compared against Germany. The eventual consequences of this faulty appreciation stand as a powerful example of the importance of developing proper doctrine, organizations, and tactics during peacetime.

B. The Current Challenge

In May 1930 General Wavell wrote an article which appeared in the Journal of the Royal United Service Institute (RUSI) entitled *The Army and the Prophets*. In this article, he outlined the dilemma that the practical reformer faces:

"The problem which faces the reformer of armies in peace might be likened to that of an architect called on to alter and modernise an old fashioned house without increasing its size, with the whole family still living in it (often

grumbling at the architect's improvements, since an extra bathroom can only be added at the expense of someone's dressingroom) and under the strictest financial limitations."⁶⁹

Today, we face the same challenges that pre-World War I and II planners faced. How well we meet these challenges now will determine our performance in a future war. Our doctrines, organizations, and tactics must accurately reflect the realities of present conditions and not wishful thinking, parochial concerns, or political expedience. The consequences of failure are too great to permit this. In the remainder of this paper I will analyze the effect of current conditions on the Elements of War and subsequently on the tank. Thereafter based on this analysis, I will form some conclusions as to the probable master-weapon of the future and its effect on organizations and tactics.

1. Conditions Affecting Weapons

It is a historical fact that every improvement in weapons has been met by a counter measure that negates the advantage.⁷⁰ These counter measures have taken the form of: different tactics, increased protection, increased firepower, or increased mobility. As mentioned earlier, the increased firepower of the machinegun and artillery was countered by the invention of the tank on the allied side and by a change in tactics on the German side. The former overcame the effects of fire by increasing mobility and

protection, and the latter by dispersing and thereby gaining greater protection.

Throughout World War II, the tank remained the dominant weapon on the battlefield. Every increase in anti-tank killing power was met by an increase in armor protection and speed, so that by the end of the war, there was little in common between the *Panzer Kampfwagen I* of 1938 and the Panther of 1944, except that they both moved on tracks.

Today, the tank remains the centerpiece of ground combat in open terrain. However, do present conditions justify this position of eminence?

From the middle of the Second World War until the present, new weapons development has focused almost exclusively on killing the tank. The tank, for its part, has countered each threat by increasing its armor and mobility. Logic, however, tells us that there is some finite limit to how much armor and, consequently, how heavy a tank can get while remaining effective.⁷¹ I believe that we have reached that point. Some observations follow:

* Top attack of armor has made the tank vulnerable to anti-tank weapons once again. Precision-guided munitions (PGMs) and aircraft attacking the tank from the third dimension present significant problems for the survivability of tanks and armored vehicles.⁷²

* The proliferation of relatively inexpensive PGMs, with high probability of kill ratios, puts the cost effectiveness of the tank into question. Can we afford expensive tanks in sufficient numbers to overcome the effect of attrition brought about by PGMs?⁷³

* Battlefield computers and sensors are revolutionizing acquisition and targeting of armor. Additionally, they are increasing the accuracy and the speed of delivery of a host of weapons. This increased ability to acquire, target, and hit quickly and accurately translates into an increase in firepower and a proportional decrease in the survivability of armor.⁷⁴

* Scatterable minefields, which put tanks in the middle of minefields that cannot be bypassed, will greatly affect tank mobility and survivability.

* Deep attack of armored formations by aircraft, guided missiles, and artillery will further reduce the effectiveness of armor against the defense by putting these vehicles at risk long before they reach the front lines.

2. Conditions Affecting Mobility

Any condition that restricts or decreases mobility favors the defense. Conversely, increases in mobility favor offensive action. The tank, being an offensive weapon, is therefore significantly affected by changes in conditions affecting mobility. The following are some of the changes

in conditions which are likely to affect mobility in a future war:

- * The increase in the main battle tank's (MBT) tactical speed is partially offset by its increased fuel consumption. This increase in fuel consumption has had the additional impact of increasing the logistical tail of the division and thereby decreasing its overall mobility.

- * The increased need for fuel presents a significant obstacle in the way of our ability to operate at the operational level of war. Increased cruising range and not tactical dash speed is the requirement at this level.

- * The ever-increasing urbanization of Western Europe and other parts of the world will serve to further slow and canalize armor formations.

- * Increases in the effectiveness of electronic warfare will make control of large formations more difficult and, thereby, slow down the tempo of operations.

- * The increased ability to acquire, target, and hit armored vehicles will also considerably slow down armored formations.

- * The above listed anti-mobility trends can be expected to synergistically interact with each other to further slow down the tempo and survivability of armored attacks.

3. Conditions Affecting Protection

Unlike increases in mobility which favor the offensive, and increases in firepower which favor the defensive, protection can be considered neutral. That is, increases or decreases in direct or indirect protection do not automatically benefit the offense or defense per se. However, in any particular period of time the general trend in conditions affecting protection can be weighed significantly towards one side or the other. Additional observations follow:

* The large increase in the number of intelligence gathering platforms (RPVs, aircraft, satellites) and sensors provide an increased level of security for the defender. Conversely, they lower the element of protection on the side of the attacker. It can be argued that the attacker also receives distinct benefits from these systems, but on the whole, I believe that the defense profits to a greater extent. This is so because the defense by its nature operates in a dispersed, initially stationary fashion while the offense must concentrate to achieve success. Thus, a force on the defense can protect itself from these systems better than can one on the offense.

* The same increase in urbanization that hindered the attacker's mobility also serves to increase the protection of the defender. In the same vein, all improvements in

countermobility technology add to the level of protection of the defender.

* On the positive side for armor, reactive armor is a significant development in armor vehicle protection. However, its drawbacks are that it adds weight, decreases mobility, and increases fuel consumption in vehicles to which it is applied. Additionally, countermeasures to defeat reactive armor are already in the fielding process.

* Also positive for armor, is the increase in the dash speed of modern fighting vehicles which provides great increases in indirect protection for these vehicles. The increased firepower of IFVs, such as the Bradley, also offers the MBT increased indirect protection.

C. Assessment of Current Conditions

On balance, I believe that the deck is stacked against ground armored mobility as the principal or master system of future war. If this assessment is correct, some serious implications come to the surface. The most important of these being: How do we react to these conditions in order to use them to our advantage?

Our current heavy doctrine, organization, and tactics are designed to fight a war of ground movement and maneuver. This orientation is very similar to the tactical thinking of the major powers prior to the First World War. Yet, I believe that in a future war ground armored movement will be

stopped as cold as infantry movement was during WWI. If indeed this is the case, and no changes are made in how we plan to fight, the results of a war against a first-rate opponent will be a quick stalemate and subsequent static warfare.⁷⁵ These conditions will continue until such a time as mobility is once again restored to the battlefield.

The challenges facing us today are like those which faced armies prior to WWII. We can be like the French Army which Doughty observes:

"...viewed technological developments from the perspective of already accepted concepts and did not perceive new ideas or weapons overturning or forcing a fundamental transformation or revision of of accepted doctrine."⁷⁶

Or, we can as the Germans did, recognize the proper master-weapon of the next war and develop our doctrine, organizations, and tactics around this weapon. If we take this second course, history shows us that we will be on a sure road to future victory.

D. The Master-Weapon of the Future

Historically, armies that have operated at a faster pace than their opponents have been singularly successful. The armies of Belisarius, Jenghiz Khan, Napoleon, and Hitler were all designed with the intent of achieving superior organizational mobility over their foes. It was as much the mobility differential that these armies enjoyed over their opponents, as the excellent leadership that they possessed, that allowed them to achieve such outstanding results.

If we posit that ground armored mobility will be severely restricted in a future war, then an army such as ours which is designed around the tank will be operating at a much reduced pace. If our opponent is similarly configured, he will also be operating at this reduced pace and therefore there should not exist a mobility differential between us. Thus, as was stated earlier, static warfare will likely ensue. However, if we were able to take advantage of these conditions and develop a way whereby we could operate at a substantially greater pace than our opponent, then we would be in the same position as the armies mentioned above. We would be able to overwhelm an opponent not similarly configured because he would not be mentally or organizationally prepared for the faster pace of operations.

The system most appropriate to take advantage of these changed conditions, and which will allow us to operate at a faster pace, is the helicopter. The helicopter offers the means to combine superior mobility with superior firepower. It possesses tenfold the speed of any given land weapons system and has an unlimited capability to disperse and converge on the battlefield. Additionally, since refueling and maintenance facilities can be well to the rear, the helicopter is logistically less vulnerable to attack than ground armored forces whose fuel and ammunition must be brought forward.⁷⁵ The helicopter has the capability of setting the pace of future combat - a pace much quicker than

that of today's ground-based organizations. And, if pace is a prime determinant of success in battle, it follows that we should recognize the helicopter as the master-weapon of the future battlefield and build our doctrine, organizations, and tactics around it.

An army operating at the pace of the helicopter will overwhelm another army operating at the pace of the tank, just as the Germans operating at the pace of the tank overwhelmed the artillery-paced French. However, as with other previous master-weapons such as the sarissa, longbow, and artillery, the helicopter will not be the decisive weapon, since currently it can neither close with the enemy nor hold terrain. For this task, armor, infantry, and artillery will be required. Thus, armor and infantry will remain the prime weapons of decision on the future battlefield.⁷⁵

As with any weapon system, the helicopter possesses certain capabilities and limitations which must be considered when planning its employment. Considering its limitations first, we find that lack of direct protection and the inability to hold ground, or to operate in close terrain, are its major limitations. Its major capabilities, on the other hand, are firepower and mobility; particularly its freedom from the constraints imposed by terrain. The latter, to a marked degree, makes up in indirect protection what the helicopter lacks in direct protection.⁷⁵

This then brings us to the question of the tactical relationship between the helicopter and ground forces. The proper relationship must be that of shield to sword. The ground armored forces as a whole now becoming the fixing force for the aerial striking force. These two forces are as complementary to each other as once were castles to sally parties, bowmen to men-at-arms, infantry to cavalry, and later, artillery to infantry.⁷⁵ Thus, the helicopter should not be viewed as a replacement for armored ground forces. Decision will still be reached on the ground. Yet, unlike today where the mission of aerial forces is to complement the ground forces, in the future we should look to the ground forces to complement the aerial forces.

A discussion of how best to organize forces to support the master-weapon is outside of the scope of this paper. Organizational design is a complex process. However, in concept what is required is a combined arms organization of division size designed around the helicopter. The ground forces would be designed and organized to perform the functions of fixing and close assault while the aerial forces would perform the function of striking. Additionally, aerial forces would play a considerable role in performing other functions such as seeing, moving, and controlling. It is important to note that this type of organization would be a replacement for the current heavy division and would be tailored to maximize the employment of the helicopter in the close battle. Thus, I am not

proposing another deep battle organization, but rather, a fundamental rethinking and reorganization of our close combat division around a new tactical idea - The AirLand Division.⁷⁵

V. CONCLUSION

Peace has historically been the interlude between wars and unless human nature has changed since our last war, we will certainly be involved in some future war. In the United States, we have been fortunate to have been spectators at the beginning of the last two world wars. This status has allowed us to observe developments and, in accordance with the results, modify our doctrine, organizations, and tactics prior to getting involved. This fortunate condition has saved thousands of American lives.

In the future, we will not have such an opportunity to stand back and see what happens. From the first shot we will be committed. It is imperative that today we not misinterpret the effects that technology and new weapons systems will have on the Elements of War, and thereby not be prepared to take full advantage of the resulting conditions. I think there are some very clear indications that we need to reorient our thinking radically to prevent this from happening.

Improvements in firepower, targeting, fire control, fire direction, reconnaissance, and countermobility

technology seriously call into question the viability of armored movement on future battlefields. Since our heavy organizations are designed around armored vehicles, such a development would have a devastating impact on our operations. Clearly, we need to recognize these changed conditions and turn them to our advantage by developing doctrine, organizations, and tactics to fight under these new conditions.

In this paper I have advanced the idea that the helicopter offers us the means to take advantage of these changed conditions. Organized properly, it will allow us to significantly quicken the pace of combat and thereby overwhelm an opponent not similarly organized. This ability to operate at a quicker pace than an opponent has historically been a hallmark of great commanders and armies.

As with the horse, some concepts and ideas die slowly. In this day and age of rapid change the price of clinging to such outmoded ideas is extremely high. As Fuller said, "There is only one means of preventing decay - never to stop growing, never to become slaves to the present or the past, never to hesitate attempting something new for fear of making a mistake."⁷⁸ Thus, we must put aside branch parochialism, political considerations, and the fear of revolutionary change, in order that we may develop doctrine, organizations, and tactics to take advantage of current conditions.

At such a time as this, it is wise to keep in mind another of J.F.C. Fuller's observations, "That armies are more often ruined by dogmas springing from their former successes than by the skill of their opponents."⁷⁵

ENDNOTES

1. S.L.A. Marshall, "Foreword" to J.F.C. Fuller, Armored Warfare, An Annotated Edition of Lectures on FSR III, (Harrisburg: The Military Service Publishing Co., 1943), p. xiii.
2. Robin Higham, The Military Intellectuals in Britain: 1918-1939, (New Brunswick: Rutgers University Press, 1966), p. 42; Brian Bond and Martin Alexander, "Liddell Hart and de Gaulle: The Doctrines of Limited Liability and Mobile Defense" in Makers of Modern Strategy, (Princeton: Princeton University Press, 1986), p. 601.
3. David H. Zook, Jr., "John Frederick Charles Fuller Military Historian," Military Affairs, Winter 1959-60p. 185.
4. J.F.C. Fuller, Memoirs of an Unconventional Soldier, (London: Ivor Nicholson and Watson Ltd., 1936), pp. 1-5.
5. Ibid., p. 22, 460.
6. Higham, The Military Intellectuals, p. 43.
7. Fuller, Memoirs, p. 463.
8. Ibid., p.43.
9. Jay Luvaas, The Education of an Army, (Chicago: The University of Chicago Press, 1964), p. 337.
10. David H. Zook, Jr., "John Frederick Charles Fuller Military Historian," Military Affairs, Winter 1959-60, p. 186.
11. Ibid., p. 186.
12. Fuller, Memoirs, pp. 54-56.
13. Zook, "Fuller," p. 186.
14. Luvaas, Education, pp. 343-344.
15. Anthony John Trythall, "Boney" Fuller, (New Brunswick: Rutgers University Press, 1977), p. 60.
16. J.F.C. Fuller, On Future Warfare, (London: Sifton Praed, 1928), pp 83-105; Fuller, Memoirs, pp. 322-340.
17. Luvaas, Education, p. 344.
18. Zook, "Fuller," p. 186.

19. Luvaas, Education, p. 359.
20. Fuller, Armored Warfare, p. xvii.
21. Ibid., p. xix.
22. Fuller, Memoirs, pp. 463, 477-478. In the title page of Memoirs he quotes Herakleitos, "Asses would rather have refuse than gold." This is a not too veiled reference to military authorities of the time.
23. Trythall, "Boney" Fuller, pp. 178-179.
24. Higham, The Military Intellectuals, p. 45.
25. J.F.C. Fuller, "The Application of Recent Developments in Mechanics and Other Scientific Knowledge to Preparation and Training for Future War on Land," The Journal of the Royal United Service Institution, May 1920, p. 240.
26. Ibid., p. 240.
27. J.F.C. Fuller, The Foundations of the Science of War, (London: Hutchinson & Co. Ltd., 1926), p. 324.
28. This idea, as well as that of the duel, is Clausewitzian in nature. In On War, (Princeton: Princeton University Press, 1984), p. 132, Clausewitz states: "The purpose of any theory is to clarify concepts and ideas that have become, as it were, confused and entangled". Although he doesn't give him credit, Fuller read and understood Clausewitz better than most of his contemporaries.
29. J.F.C. Fuller, "The Foundations of the Science of War" The Army Quarterly, Volume 1, (October 1920 and January 1921), p. 91.
30. Ibid., p. 110.
31. Ibid., pp. 91-92.
32. J.F.C. Fuller, "Tactics and Mechanization," Infantry Journal, May 1927, p. 457.
33. J.F.C. Fuller, Machine Warfare, (Washington: The Infantry Journal, 1943), p. 72.
34. Fuller, "Tactics and Mechanization," pp. 460-461. Fuller lists these functions as: to discover, to hold, to hit, to protect, and to smash.
35. Fuller, Foundations, pp. 148-149.
36. Ibid., p. 150.

37. Ibid., p. 151.
38. Fuller, "Future War on Land," p. 251.
39. Ibid., p. 251-252.
40. Fuller, Foundations, p. 154.
41. Fuller, Foundations, p. 57. Fuller believed the mental sphere to be controlled by three interacting faculties: reason, imagination, and the will; the moral sphere by: fear, morale, and courage; and the physical sphere by: offensive, protective, and mobile powers. For simplicity I have not expanded on each of these separately.
42. Ibid., pp. 123-124.
43. Fuller, "Foundations," p. 96.
44. Ibid., p. 96.
45. Fuller, Foundations, pp. 124-128.
46. Ibid., pp. 126-127.
47. Ibid., pp. 227-229.
48. Ibid., pp. 175-192.
49. Ibid., p. 192.
50. Ibid., p. 193.
51. Fuller, Machine Warfare, pp. 82-83.
52. J.F.C. Fuller, "The Master Weapon and its Influence on Tactics," The Army Quarterly, August 1942, p. 230.
53. J.F.C. Fuller, "A Study of Mobility in the American Civil War," The Army Quarterly, October 1934 and January 1935, p. 271.
54. Fuller, "The Master Weapon," p. 230.
55. For example, the J-series infantry battalion of today is organized to serve as a holding force. It has organic to it an antiarmor company not found in the armor battalion. Thus, the infantry heavy task force is designed to functionally fix while the armor heavy task force strikes.
56. Fuller, "The Master Weapon," p. 235.

57. J.F.C. Fuller, "The Tactics of Penetration," The Journal of the United Service Institution, November 1914, p. 379.
58. Fuller, "The Master Weapon," p. 235.
59. Jack Snyder, The Ideology of the Offensive, Military Decision Making and the Disasters of 1914, (Ithaca: Cornell University Press, 1984), pp. 15-40.
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61. Lynn Montross, War Through the Ages, (New York: Harper & Row, 3d Edition, 1960), pp. 685-694.
62. F.O. Miksche, Atomic Weapons and Armies, (London: Faber & Faber Ltd., 1955), p. 17, 47.
63. Irving M. Gibson, "Maginot and Liddell Hart: The Doctrine of Defense," in Makers of Modern Strategy, (Princeton: Princeton University Press, 1943), pp. 371-375.
64. Robert A. Doughty, The Seeds of Disaster: The Development of French Army Doctrine 1919-1939, (Hamden: Archon Books, 1985), pp. 10, 91-110.
65. Ibid., p. 137.
66. Ibid., p. 159.
67. Ibid., pp. 161-177; General Charles de Gaulle, The Army of the Future, (Philadelphia: J.B. Lippincott Co., 1941), pp. 134-147.
68. Brian Perret, A History of Blitzkrieg, (New York: Stein and Day, 1983), pp. 64-76.
69. Charles, Messenger, The Blitzkrieg Story, (New York: Charles Scribner's Sons, 1976), p. 74.
70. Fuller, Machine Warfare, pp. 78-79.
71. LTC John G. Heslin, "Mobility: Key to Success on the Extended Battlefield," Military Review, August 1981, p. 60.
72. Richard Simpkin, Antitank, An Airmechanized Response to Armored Threats in the 90's, (Oxford: Brassey's Publishers Ltd., 1982), pp. 56-58.

73. F.O. Miksche, "PGMs are Changing the Combat Picture," Military Review, July 1978, p. 12.
74. Hung P. Nguyen, "Soviet Thinking on the Next Land War," Parameters, Vol. XV, No. 4, 1985, pp. 42-43.
75. Ibid., pp. 44-46.
76. Doughty, The Seeds of Disaster, p. 182.
77. General Dr. F. M. von Senger und Etterlin, "New Operational Dimensions," Journal of the Royal United Service Institute, June 83, p. 13; Richard Simpkin, Race to the Swift, (Oxford: Brassey's Publishers Ltd., 1985), pp. 117-132.
78. I have made the case that ground armored mobility will be restricted in a future battlefield in much the same fashion as infantry movement was during WWI. This in no way is meant to convey the idea that armor is obsolete. Rather, the analogy that I wish to present is that in the same manner that the tank restored mobility to the WWI battlefield - to include infantry mobility - the helicopter will permit mobility in a future battlefield - to include ground armored mobility.
79. Richard Simpkin, "Flying Tanks? - A Tactical-Technical Analysis of the Main Battle Air Vehicle Concept," Military Technology, August 1984, p. 62.
80. Fuller, Machine Warfare, pp. 84-85.
81. Although as previously noted force design is outside of the scope of this paper, this organization would be designed to maximize the employment of the helicopter and increase the tactical pace. At the brigade level, it would consist of a mix of organic attack helicopter, armor, and infantry battalions. At the division level it would incorporate a CAB of three attack battalions and a heavy-lift battalion designed to transport indirect fire means (artillery, airmobile MLRS, ground-launched hellfire). The division structure would also include an RPV battalion under the DIVARTY to acquire targets for the air transported indirect fire means.
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83. Fuller, "Tactics of Penetration," p. 389.

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